

In the Drawings

The Applicant encloses an amended set of drawings each of which is labelled "Replacement Sheet" in the upper margin for substitution for the drawings presently of file. A further copy of the page containing Figure 6 is enclosed and labelled "Annotated Marked Up Drawing" to illustrate the amendment to Figure 6.

In the Disclosure

Please amend pages 4, 5, 6 and 7 in accordance with the revisions shown on the following pages.

REMARKS

Claim Status

Claims 1-15 are pending in the application. Claims 1-15 were rejected by the Examiner.

Drawings

Figure 6 has been amended as requested by the Examiner to change reference numeral “43” to --42--.

Specification

The disclosure has been amended to use the expression “reactor bed 18” consistently throughout. Accordingly “catalyst” has been replaced with --reactor—on page 4, line 22 and page 5, line 1.

Page 6 has been amended on line 14 to correctly identify the second chamber with reference numeral “16”.

Page 7 has been amended as suggested by the Examiner to refer to the member “or assembly” at lines 7 and 9. Applicant thanks the Examiner for pointing out the foregoing minor errors.

Claim Amendments and Objections

Claim 1 has been amended to specify that the reactor bed has a plurality of discrete flow passages extending longitudinally therethrough (i.e. a honeycomb type substrate) and to make it clear that fluid flow passes back and forth through the reactor bed with each pass opposite to the immediately preceding pass. The reasons underlying the change are discussed below with respect to the Examiner’s section 102 and 103 rejections. Support for the plurality of discrete flow passages is found on page 5 at lines 1 through 4. Support for the number and direction of passes is found in the drawings taken in conjunction with page 6 of the specification, lines 5 through 22.

Claim 1 has also been amended to correct a misspelling of “said” in what was formerly line 4 and is now line 7.

Claim 1 has also been amended to make reference to a --catalyst bearing reactor bed-- rather than "catalyst bed" to provide antecedent basis for the expression "reactor bed" throughout.

Claim 4 has been amended to depend from claim 1 and to specify that each of the inlet and outlet passages extends through an end of the housing.

Claim 8 has been amended to specify that the outlet passage extends into the second chamber (rather than through the second end of the housing).

Claims 9, 11 and 12 have been amended to change "bed" to -- catalyst--.

Claims 7 and 13 have been amended to include the feature that the reactor bed is made up of sections for which support is found commencing at line 23 on page 6.

Claim Rejections – 35 USC 112

The Examiner objected to claim 4 stating that it is unclear as to how both of the inlet and outlet passages could extend through an end of the housing in view of the restriction in claim 2 that one must extend through a side of the housing. Claim 4 has been amended to depend from claim 1 to correct this oversight.

The Examiner rejected claim 8 stating that it is unclear as to whether the second end is the end set forth in claim 2, line 2. Applicant has amended claim 8 to refer to the "second chamber" rather than the "second end" which was the original intention.

The Examiner rejected claim 9 stating that it is unclear as to what structural limitation Applicant is attempting to recite as it appears to be redundant in view of claim 6 as depending from claim 4. Applicant notes that claim 9 specifies the reactor of claim 8 further having the inlet and outlet passages at opposite ends of the reactor (i.e. the inlet passage extends into the first chamber and the outlet passage extends into the second chamber). Claim 6 as depending from claim 4 would cover having the inlet and outlet passages at the same end or opposite ends of the housing.

Claim Rejections – 35 USC 102

The Examiner rejected claim 12 stating that in line 2 "said reducing bed" and "said oxidizing bed" have no clear antecedent basis. "Bed" has been replaced by -- catalyst-- in both occurrences which finds antecedent in claim 6 from which claim 12 depends.

The Examiner rejected claim 1 as being anticipated by U.S. Patent No. 6,159,429 (Bemel). As discussed below, Applicant respectfully submits that the claim 1 amendment patentably distinguishes over the Bemel reference.

Bemel discloses a particulate type catalytic reactor with a zigzag flow passage therethrough. Applicant understands that the Examiner cited Bemel as the former language of claim 1 simply required flow passage through a housing from an inlet passage through at least three discrete zones of a reactor bed to an outlet passage.

While Bemel might technically have met the requirements of former claim 1, quite clearly it is a different arrangement than that of the present invention. Claim 1 has been amended to specify that the reactor bed has a plurality of discrete flow passages extending longitudinally therethrough (i.e. a honeycomb type substrate) and to make it clear that the flow passes back and forth through the reactor bed with each pass opposite to the immediately preceding pass.

The Examiner further rejected claim 1 as being anticipated by U.S. Patent No. 3,832,443 (Hass).

Hass also appears to use a zigzag type of flow path longitudinally down the reactor bed rather than back and forth through it as in the present case. Accordingly, the foregoing revisions to claim 1 also extend to patentably distinguish over Hass.

The Examiner further stated that claim 1 reads structurally on reference WO 97/43528 (Frederiksen et al). Although the Examiner doesn't state which view in Frederiksen he is referring to, from the reference numerals applied by the Examiner, Applicant assumes the Examiner is referencing Figure 1. Regardless of which figure is being referred to, Applicant notes that none of the variations show the use of baffles in a first or a second chamber which extend between a catalyst bed and the housing. Furthermore none of the illustrations show at least three passes through a reactor bed. Although Figure 10 does appear to show passes in opposite directions through monoliths 5ii and 5i, Figure 10 does not meet the requirement of at least three passes and furthermore the first and second chambers don't directly fluidly communicate through the catalyst bed but rather through a pipe or channel 6.

Applicant therefore respectfully submits that in view of at least the foregoing differences Frederiksen et al cannot anticipate claim 1 as amended.

Claim Rejections – 35 USC 103

The Examiner has rejected claims 2-13 as being obvious in view of Frederiksen et al and French reference 2226865 stating that Frederiksen discloses all of the features of the claims but fails to disclose whether at least one of the inlet and outlet passages may extend through a side of the housing. The Examiner states that the French reference discloses a muffler having at least one of the inlet and outlet passages extending through a side and/or ends of the housing.

Applicant respectfully submits that as discussed above claim 1 and accordingly claims 2-13 which depend therefrom are patentably distinguishable over the Frederiksen reference significant points of difference include the baffle arrangement and the requirement for at least three sequential passes through the reactor bed with each subsequent pass being through a discrete laterally adjacent zone of the reactor bed and opposite in direction to an immediately preceding pass. As this feature is absent from Frederiksen and is not suggested by the French reference, no combination of the references would yield the present invention. Accordingly Applicant respectfully submits that the present invention cannot be considered obvious in view of Frederiksen and the French reference.

The Examiner rejected claims (14-15)/1 in view of Frederiksen et al, U.S. Patent No. 4,601,168 (Harris) and U.S. Patent No. 5,578,277 (White et al). The Examiner further rejected claims (14-15)/2 as being obvious in view of Frederiksen, the French reference, Harris and White.

Applicant respectfully submits that none of the cited references teach the limitations which have been added to claim 1 from which claims 14 and 15 depend in that they do not teach a reactor bed having a plurality of discrete flow passages extending longitudinally therethrough to provide fluid communication between first and second chambers and further requiring at least three sequential passes through the reactor bed with each subsequent of the passes being through a discrete, laterally adjacent zone of the reactor bed and opposite in direction to an immediately preceding of the passes. As no combination of the cited references would yield a structure incorporating the features in now amended claim 1, Applicant respectfully submits that claim 1 patentably distinguishes over the references.

Double Patenting

Finally, the Examiner rejected the claims under the judicially created doctrine of obviousness-type double patenting.

In view of Applicant's amendments to claim 1, Applicant respectfully submits that this is not the case. The issued patent (U.S. Patent No. 6,622,482 B2) provides for sequential unidirectional flow through adjacent zones of the reactor bed. This requires a configuration which has passage means for returning exhaust gasses from a second end of the reactor bed to reintroduce them into the first end so that the next pass can be in the same direction. In contrast, the present invention provides for back and forth flow through the reactor bed with each subsequent pass flowing directly through the bed and in a direction opposite to the immediately preceding pass. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw this rejection.

For all of the reasons set out above, Applicant respectfully submits that the application as amended is in condition for allowance and action toward that goal is respectfully requested.

Respectfully submitted,



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PM:hcu

Enc.

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Annotated Marked Up Drawing

4/6

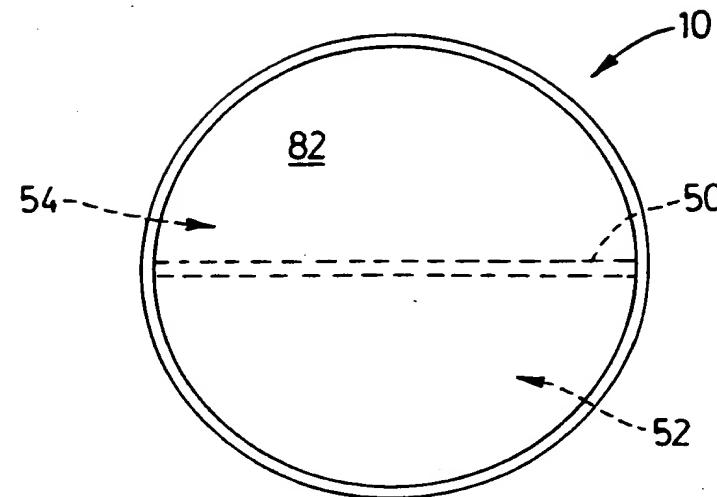


FIG. 5

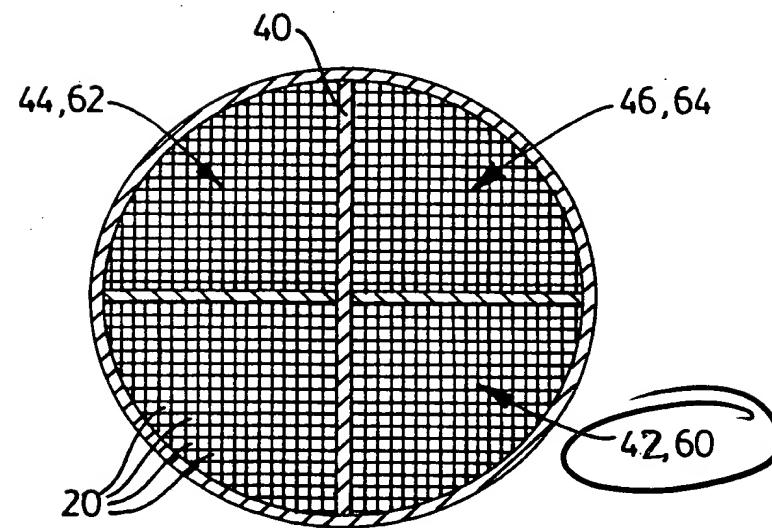


FIG. 6